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NATIONAL DAM SAFETY PROGRAM. MITCHELLS DAM (INVENTORY NUMBER VA--ETC(U)
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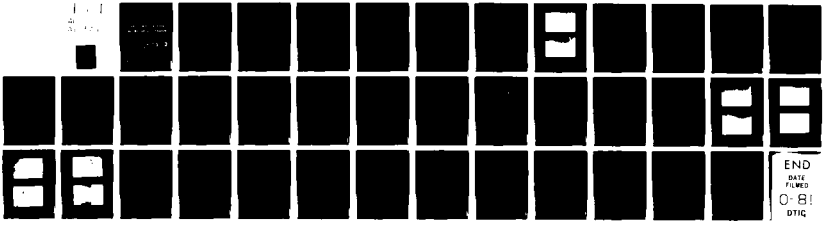
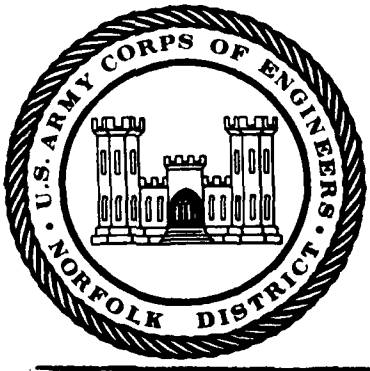


STAUNTON RIVER BASIN

LEVEL

Name Of Dam: MITCHELLS
Location: PATRICK COUNTY
Inventory Number: VA 14109

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



PREPARED BY
NORFOLK DISTRICT CORPS OF ENGINEERS
803 FRONT STREET
NORFOLK, VIRGINIA 23510

MAY 1981

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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10 Boris O. Taran

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National Dam Safety Program Phase I
Dam Safety
Dam Inspection

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

(See reverse side)

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

20. Abstract

Pursuant to Public Law 92-367, Phase I Inspection Reports are prepared under guidance contained in the recommended guidelines for safety inspection of dams, published by the Office of Chief of Engineers, Washington, D. C. 20314. The purpose of a Phase I Inspection is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the gereral conditions of the dam is based upon available data and visual inspection. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to idenify any need for such studies.

Based upon the field conditions at the time of the field inspection and all available engineering data, the Phase I report addresses the hydraulic, hydrologic, geologic, geotechnic, and structural aspects of the dam. The engineering techniques employed give a reasonably accurate assessment of the conditions of the dam. It should be realized that certain engineering aspects cannot be fully analyzed during a Phase I inspection. Assessment and remedial measures in the report include the requirements of additional indepth study when necessary.

Phase I reports include project information of the dam appurtenances, all existing engineering data, operational procedures, hydraulic/hydrologic data of the watershed, dam stability, visual inspection report and an assessment including required remedial measures.

ROANOKE RIVER BASIN

NAME OF DAM: MITCHELLS DAM
LOCATION: PATRICK COUNTY, VIRGINIA
INVENTORY NUMBER: VA 14109

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

PREPARED BY
NORFOLK DISTRICT CORPS OF ENGINEERS
803 FRONT STREET
NORFOLK, VIRGINIA 23510

MAY 1981

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of the Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the design flood should not be interpreted as necessarily posing a highly inadequate condition. The design flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

BRIEF ASSESSMENT OF DAM

Name of Dam:	Mitchells Dam
State:	Virginia
Location:	Patrick County
USGS Quad Sheet:	Stuart, Virginia
Stream:	Tributary of Waterfall Branch to the Smith River
Date of Inspection:	13 May 1981

Mitchells Dam is an earthfill structure about 350 feet long and 54.9 feet high. The dam is owned and maintained by Mr. S. H. Mitchell of Winston Salem, North Carolina. The dam is classified as an intermediate size dam with a significant hazard classification. The principal spillway is a 5-inch steel drop-inlet located in the left portion of the reservoir. The emergency spillway is an open channel cut into the right abutment. The reservoir offers minimal recreation.

Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) is the 1/2 PMF. The emergency spillway is capable of passing the SDF. The spillway is adjudged adequate.

The visual inspection revealed no apparent problems and there is no immediate need for remedial measures. Due to the steepness of the upstream slope it is recommended that the services of a geotechnical engineering firm be engaged to evaluate the stability of the dam during the sudden drawdown condition. In addition, it is recommend that within 12 months the deficiencies noted in section 7.2 be corrected.

Submitted By:

Original signed by:
Carl S. Anderson, Jr.

CARL S. ANDERSON, JR.
Acting Chief, Design Branch

Approved:

Original signed by:
Douglas L. Haller

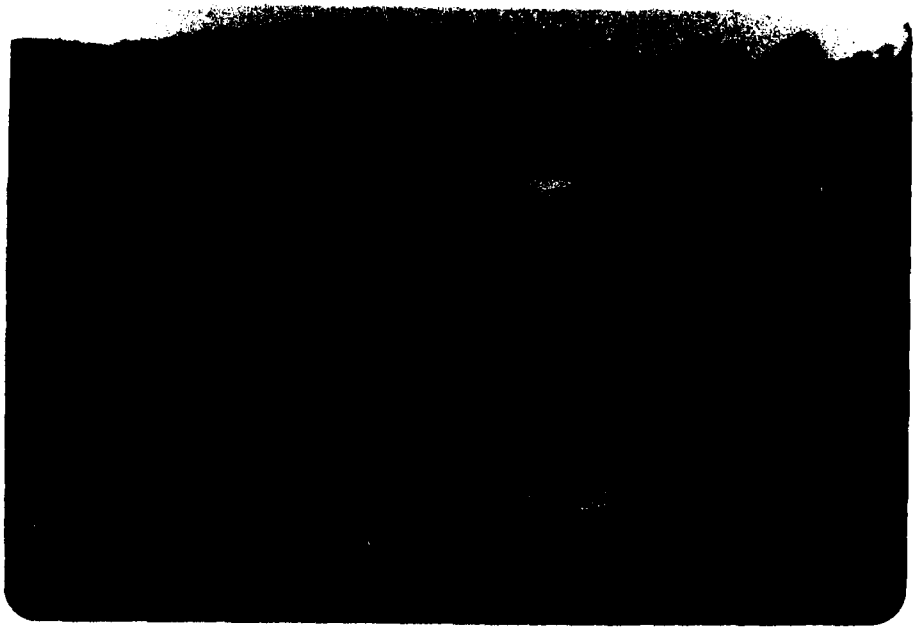
DOUGLAS L. HALLER
Colonel Corps of Engineers
Commander and District Engineer

Date: AUG 5 1981

Recommended By

Original signed by
JACK G. STARR

JACK G. STARR
Chief, Engineering Division



OVERALL VIEWS - MITCHELLS DAM

13 MAY 1981

SECTION 1

PROJECT INFORMATION

1.1 General:

1.1.1 Authority: Public Law 92-367, 8 August 1972, authorized the Secretary of the Army, through the Corps of Engineers to initiate a National Program of Safety Inspections of Dams throughout the United States. The Norfolk District has been assigned the responsibility of supervising the inspection of dams in the Commonwealth of Virginia.

1.1.2 Purpose of Inspection: The purpose is to conduct a Phase I inspection according to the Recommended Guidelines for Safety Inspection of Dams (Reference 1, Appendix IV). The main responsibility is to expeditiously identify those dams which may be a potential hazard to human life or property.

1.2 Project Description:

1.2.1 Dam and Appurtenances: Mitchells Dam is an earthfill structure about 350 feet long and 54.9 feet high. The crest of the dam is 14 feet wide at elevation 2855.0 ft msl. A private dirt driveway to the owners cabin traverses the crest of the dam. The upstream slope is approximately 1.6 horizontal to 1 vertical (1.6H:IV) and the downstream slope is 2.5H:1V. There is no riprap slope protection.

It is unknown if the dam is keyed into the foundation or if there are any foundation drains. No foundation drain outlets were found during the inspection.

The principal spillway is a 5-inch steel pipe acting as a drop-inlet, located in the left portion of the reservoir. The intake pipe is placed along the reservoir side slope. Near the bottom of the reservoir the pipe passes through the embankment and discharges at the toe of the dam. The intake and outlet elevations are 2850.0 and 2801.1, respectively.

The emergency spillway is an open channel cut into the right abutment. The emergency spillway is approximately 150 feet wide and the crest is at elevation 2852.0.

There is a valve operating stem connected to the principal spillway that controls a drawdown valve at the bottom of the reservoir.

1.2.2 Location: Mitchells Dam is located on a tributary of Waterfall Branch of the Smith River about 1 mile east of Vesta, Virginia, just north of U. S. Route 58 in Patrick County.

1.2.3 Size Classification: The dam is classified as intermediate as defined in Reference 1 of Appendix IV.

1.2.4 Hazard Classification: The dam is located about 1.5 miles upstream of two homes. Due to the steep drop in elevation between the dam and the homes, a dam failure could cause property damage and threaten some lives. Therefore, a significant hazard classification is given according to guidelines contained in Section 2.1.2 of Reference 1, Appendix IV. The hazard classification used to categorize a dam is a function of location only and has nothing to do with its stability or probability of failure.

1.2.5 Ownership: Mr. S. H. Mitchells of Winston Salem, North Carolina.

1.2.6 Purpose: Recreation

1.2.7 Design and Construction History: The design of Mitchells dam is not known. The dam was completed in 1960 by John C. West.

1.2.8 Normal Operational Procedures: Water flows automatically through the principal spillway as the pool rises above elevation 2850.0. Should the reservoir rise above elevation 2852.0, water will pass through the emergency spillway.

1.3 Pertinent Data:

1.3.1 Drainage Area: The dam controls a drainage area of 0.06 square miles.

1.3.2 Discharge at Dam Site: The maximum flood at the dam site is unknown.

Pool level at crest of dam

Emergency Spillway.....1357 cfs

1.3.3 Dam and Reservoir Data: Pertinent data on the dam and reservoir are shown in the following table:

TABLE 1.1 DAM AND RESERVOIR DATA

Item	Elevation feet msl	Reservoir Capacity			
		Area Acres	Acre feet	Watershed, Inches	Length, feet
Crest of Dam	2855	5.4	92	28.8	750
Emergency Spillway Crest	2852	4.9	78	24.4	725
Principal Spillway Crest	2850	4.6	69	21.6	700
Streambed at Downstream toe of dam	2800.1	-	-	-	-

SECTION 2

ENGINEERING DATA

2.1 Design and Construction Records: There were no design plans, construction records or as-built plans available for analysis during the preparation of this report.

2.2 Evaluation: There is insufficient information to evaluate the foundation condition and the embankment stability.

SECTION 3

VISUAL INSPECTION

3.1 Findings:

3.1.1. General: The field inspection was conducted on 13 May 1981. The weather was sunny and dry with temperatures in the low seventies. Ground surface conditions along the embankment were moist. At the time of the inspection the pool elevation was at 2839.1 ft. msl which is approximately eleven feet below the normal pool elevation of 2850.0. Overall the dam appears in good condition. However, several deficiencies were observed necessitating remedial treatment. A field sketch of the conditions observed during the inspection is located in Appendix I.

3.1.2 Embankment: The inspection revealed the embankment to be in overall good condition. There were no signs of surface cracks on the embankment. No unusual movement or cracking was observed at or beyond the embankment toe. There was no major sloughing or erosion of the embankment. However, the upstream slope did have minor erosion extending from the existing pool to the normal pool elevation . Also, there was minor sloughing at the embankment - pool interface. Several gullies were observed extending down the downstream slope. The gullies appeared to be stable with a protective covering of decayed leaves and vegetation. There was no riprap protection on the dam.

The vertical and horizontal alignment of the dam appeared good with a gentle grade from the left abutment down to the right abutment. There was no evidence of internal drains found during the inspection. A spring flowing clear water was noted exiting from the downstream left abutment toe in the vicinity of the abutment - embankment interface. The temperature of the spring flow was 54° while that of the principal spillway effluent and plunge pool was 49° and 56°, respectively. A swampy area exists at the downstream toe of the dam.

The upstream embankment face is covered with weeds, small trees and thorny vines down to the normal pool elevation. The embankment is void of vegetation below the normal pool elevation. The crest of the dam, which is traversed by a dirt road, is covered with weeds and grass. The downstream slope is completely overgrown with large trees, some 12 to 18 inches in diameter, and heavy undergrowth. The predominant surface soil on the embankment is a red clayey silt (ML) while surface soils in the immediate area are a mixture of very fine sands (SM) and red clayey silts (ML).

3.1.3 Appurtenant Structures: An emergency spillway is located at the right abutment. The spillway is very ill defined and exists as a shallow depression approximately a hundred and fifty feet wide. The approach channel is mildly sloped with sparse vegetation. The discharge channel, which extends down the downstream right abutment, is heavily wooded in places. The principal spillway intake is located along the left reservoir rim. It consists of a 5-inch diameter steel pipe, with a trash rack at the normal pool elevation. A valve stem was observed running along the spillway pipe. The spillway pipe and valve stem are corroded. The principal pipe extends at low level through the dam and exits at the downstream toe just above a small pond. A visually estimated flow greater than 10 GPM was exiting the principal spillway pipe. Since normal pool was below the intake, it is suspected that the gate valve is either partially opened or rusted through.

3.1.4 Reservoir Area: The area around the reservoir is primarily used as grazing land. The topography consists of gently rolling hills. The reservoir slopes are steep and void of vegetation below the normal pool elevation. The inspection team was unable to evaluate the sedimentation in the reservoir.

3.1.5 Downstream Channel: A dam impounding a small pond is located downstream of the Mitchells Dam. The dam is partially breached in the vicinity of its emergency spillway. The area below the small dam is steep and heavily wooded with some debris evident. The surrounding slopes are moderate to steep with heavy vegetation. There are two homes about 1.5 miles downstream of the dam. Due to the significant drop in elevation from the dam to the homes, a dam failure could produce property damage and possibly loss of life.

3.1.6 INSTRUMENTATION: There is no instrumentation on the dam.

3.2 Evaluation: Overall the dam and appurtenant structures appear in good condition. No evidence of instability was observed in either the dam or the foundation. There is no regular maintenance program as evidenced by the heavy vegetative cover on the embankment. The trees, shrubs and saplings on the dam should be cut down to ground level so as to prevent possible degradation of the embankment caused by the root system. The root system of trees greater than 3 inches in diameter should be removed in its entirety and the cavities backfilled with a compacted fill and seeded. Another benefit of a cleared embankment would be to provide better access for visual inspections so potential problems can be spotted and remedial actions undertaken before serious hazards develop. Any animal burrows discovered during the embankment clearing should be backfilled and seeded. The spring noted in paragraph 3.1.2 should be monitored for increase in size and/or turbidity. If these conditions develop, a qualified geotechnical engineer should be consulted to evaluate the situation.

The relatively low existing pool level as compared to the normal pool level is indicative of excessive water losses. The water losses may be partially a result of a high evaporation rate brought about by prolonged dry weather. The owner, Mr. Mitchells, informed inspection personnel that the borrow material for the dam was excavated from within the reservoir area. During initial filling of the reservoir the pool level failed to reach anticipated elevations. In an effort to decrease seepage loses, the pool was drained and a thick blanket of fine borrow material was placed back into the excavated reservoir bottom. This effort, according to the owner, decreased seepage significantly. The area soils are residual, grading from very fine silts at the ground surface down to rock with depth. It is believed that during initial construction of the dam the borrow excavation extended through the fine shallow soils into the coarser soils which could account for the initial high water loss. As noted in paragraph 3.1.3, a significant amount of water was observed exiting the 5-inch principal outlet. It is recommended, that if the owner wishes to decrease water losses from the reservoir, that he limit or stop the outflow from the principal spillway. In addition to the above measures, a staff gage should be installed, extending above the crest of the dam, to monitor reservoir levels above normal pool.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures: The normal storage pool elevation is 2850.0, which is the crest of the 5-inch steel pipe principal spillway. Water passes automatically through the principal spillway as the reservoir rises above elevation 2850.0. Water will pass through the emergency spillway when the reservoir rises above elevation 2852.0. A valve operating stem connected to the principal spillway can be operated to dewater the reseroir through a valve of the bottom of the reservoir.

4.2 Maintenance: There is no formal maintenance program for Mitchells Dam.

4.3 Warning System: At present time, there is no warning system or evacuation plan for Mitchells Dam.

4.4 Evaluation: The dam does not require an elaborate operational and maintenance procedure. However, an inspection and maintenance program should be initiated. An emergency operation and warning plan should be developed. It is recommended that formal emergency procedures be prepared and furnished to all persons responsible of maintaining the dam and facilities. This should include:

a. How to operate the dam during an emergency.

b. Who to notify in case evacuation from the downstream area is necessary.

SECTION 5

HYDRAULIC/HYDROLOGIC DATA

5.1 Design: None were available.

5.2 Hydrologic Record: None were available.

5.3 Flood Experience: The maximum flood at Mitchells Dam is not known.

5.4 Flood Potential: The 100-year flood, 1/2 PMF, and PMF were developed and routed through the reservoir by use of the HEC-1DB computer program (Reference 2, Appendix IV) and appropriate unit hydrograph, precipitation and storage-outflow data. Clark's Tc and R coefficient for the local drainage area was estimated from basin characteristics. The rainfall applied to the developed unit hydrographs was obtained from the U. S. Weather Bureau Publications (Reference 3 and 4 of Appendix IV).

5.5 Reservoir Regulation: Pertinent dam and reservoir data are shown in Table 1.1.

Water passes automatically through the principal and emergency spillways as the reservoir rises above elevations 2850.0 and 2852.0, respectively.

The storage curve was developed based on areas obtained from a U. S. Geological Survey Quadrangle Map. Survey data taken during the inspection was correlated to the Stuart, Virginia Quadrangle Map to help develop area-storage data. Rating curves for the emergency spillway, non- overflow section, and the drawdown gate were developed. In routing hydrographs through the reservoir, it was assumed that the initial pool level was at the principal spillway crest (elevation 2850.0). Flow through the principal spillway was neglected during the routings.

5.6 Overtopping Potential: The probable rise in the reservoir and other pertinent information on reservoir performance is shown in the following table:

Table 5.1 RESERVOIR PERFORMANCE

Item	Normal Flow	100 1/ Year	1/2 PMF	PMF 2/
Peak flow c.f.s.				
Inflow	.1	192	545	1091
Outflow	.1	35	456	953
Maximum elevation ft. msl	2850.0	2852.13	2853.41	2854.35
Non-overflow section (elevation 2855.0)				
Depth of flow, ft.	-	-	-	-
Duration, hrs.	-	-	-	-
Velocity, fps 3/	-	-	-	-
Tailwater elevation ft. msl	2800.7	-	-	-

1/ The 100-Year Flood has one chance in 100 of occurring in any given year.
2/ The PMF is an estimate of flood discharges that may be expected from the most severe combination of critical meteorologic and hydrologic conditions that are reasonably possible in the region.
3/ Critical Velocity

5.7 Reservoir Emptying Potential: An assumed 5-inch steel gate valve at the bottom of the reseroir is available for dewatering the reservoir. The invert elevation of the intake is assumed to be approximately elevation 2820.0. A 5-inch valve will allow a discharge of 3.5 cfs with the reservoir pool at elevation 2850 and essentially dewater the dam in about 27 days. This is equivalent to an approximate drawdown rate of 1.1 feet per day based on the hydraulic height measures from normal pool divided by the time to dewater the reseroir.

5.8 Evaluation: Based on the size (intermediate) and hazard classification (significant), the recommended Spillway Design Flood (SDF) is 1/2 PMF to the PMF. Because of the risk involved, the 1/2 PMF has been selected as the SDF. The emergency spillway will pass the SDF without flow overtopping the crest of the dam.

Conclusions pertain to present day conditions. The effect of future development on the hydrology has not been considered.

SECTION 6

DAM STABILITY

6.1 Foundation and Abutments: The dam is located in the Piedmont physiographic province of Virginia. Generally, the area geology consists of shallow residual soils overlying metamorphic rocks. Locally the bedrock is a mica shist. It is unknown if the dam has a foundation drainage system. There are no drain outlets. It is also unknown if the dam is keyed into the foundation. The predominate foundation materials are considered stable.

6.2 Embankment:

6.2.1 Materials: There is no information available on the nature of the embankment materials. According to the owner, borrow material was excavated from within the area presently covered by the reservoir. The area soils range from silty sands to high plastic clayey silts which are consistent with the surface materials found on the dam embankment.

6.2.2 Stability: There are no available stability calculations. The dam is approximately 54.9 feet high with a crest width of 14.0 feet. A dirt road traverses the crest of the dam. The upstream and downstream slopes are 1.6H:1V and 2.5H:1V respectively. The normal pool is at an elevation of 2850.0 msl. However, at the time of the inspection the pool elevation was relatively low at an elevation of 2839.1 msl. There is approximately 5.0 feet of freeboard from the normal pool to the crest of the dam. The dam will be subject to rapid drawdown due to the low level principal spillway drain which can drain the pool at a rate exceeding the critical rate of 0.5 ft/day. It is not known if the dam has ever been subjected to rapid drawdown.

6.2.3 Seismic Stability: The dam is located in Seismic Zone 2. Therefore, according to the Recommended Guidelines for Safety Inspection of Dams, the dam is considered to have no hazard from earthquakes provided static stability conditions are satisfactory and conventional safety margins exist.

6.3 Evaluation: There is insufficient engineering information to adequately evaluate the stability of the dam. In addition the upstream slope of the dam is much steeper than recommended for this size structure. For this reason it is recommended that the services of a qualified geotechnical engineering firm be engaged to determine the stability of the dam during the sudden drawdown condition. However, the visual inspection revealed no apparent instability. Based on the visual inspection, the foundation is considered sound. The embankment is considered stable during existing pool operations. The dam will not be overtopped during the SDF flood.

SECTION 7

ASSESSMENT/REMEDIAL MEASURES

7.1 Dam Assessment: The available engineering data is insufficient to evaluate the embankment stability. In addition, the upstream slope is very steep and is subjected to a sudden drawdown. Based on the two conditions, there is sufficient concern toward the integrity of the embankment and a stability check of the dam is required. However, the visual inspection revealed no findings to prove the dam unsound. Based on criteria established by the Department of the Army, Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) is the 1/2 PMF. The emergency spillway will pass 100 percent of the PMF or 100 percent of the SDF without overtopping the crest of the dam. The spillway is considered adequate. Overall the dam is in good condition and there is no immediate need for remedial measures. A stability check of the dam is required.

7.2 Recommended Remedial Measures: It is recommended that the services of a qualified geotechnical engineering firm be engaged to determine the stability of the dam during the sudden drawdown condition. It is also recommended that the regular maintenance operation program be instituted and documented for future reference. A formal emergency procedure should be prepared, and furnished to all operating personnel. This should include how to operate the dam during an emergency, and who to notify, including public officials, in case evacuation from the downstream area is necessary. Also, the inspection revealed the following maintenance items that should be scheduled by the owner during a regular maintenance period within the next 12 months:

a. Any animal burrows located on the embankments should be backfilled and seeded.

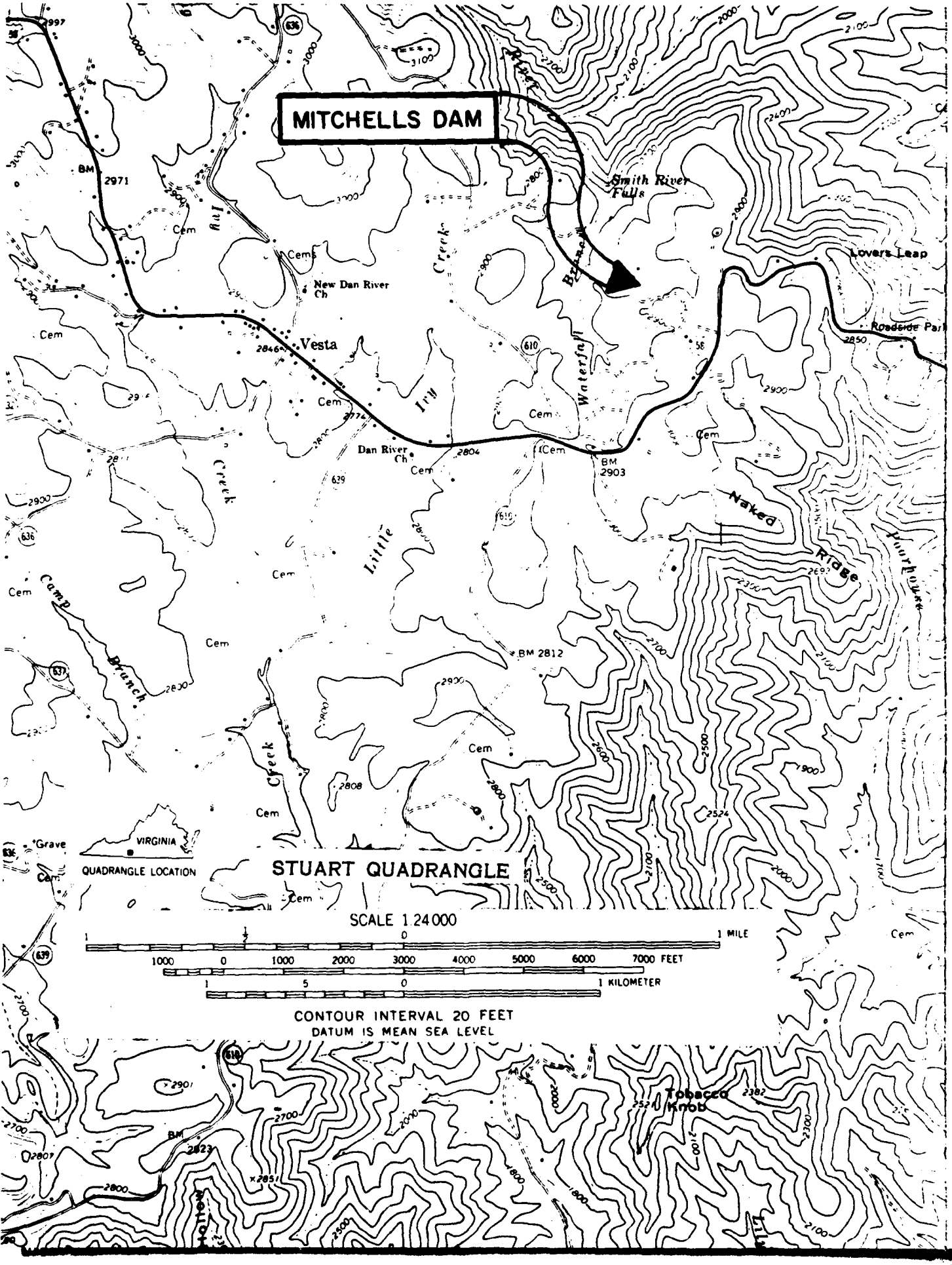
b. The spring noted in Section 3.1.2, in the vicinity of the downstream abutment-embankment interface should be monitored for increase in size and/or turbidity. If either condition develops a geotechnical engineer should be consulted to evaluate the situation.

c. The trees, shrubs and saplings on the embankment should be cut off at ground level. The root system of trees, greater than 3 inches in diameter, should be removed in there entirety and the cavities backfilled with a compacted fill and seeded.

d. A staffgage should be installed in the reservoir to extend above the crest of the dam.

APPENDIX I

MAPS AND DRAWINGS


MITCHELLS DAM
Smith River Falls
Lovers Leap
Roadside Park
New Dan River Ch
Vesta
Dan River Ch
BM 2971
BM 2903
BM 2812
BM 2823
Naked Ridge
Tobacco Knob
Waterfall Branch
Camp Branch
Little Creek
Cem
VIRGINIA
QUADRANGLE LOCATION
STUART QUADRANGLE
SCALE 1:24000
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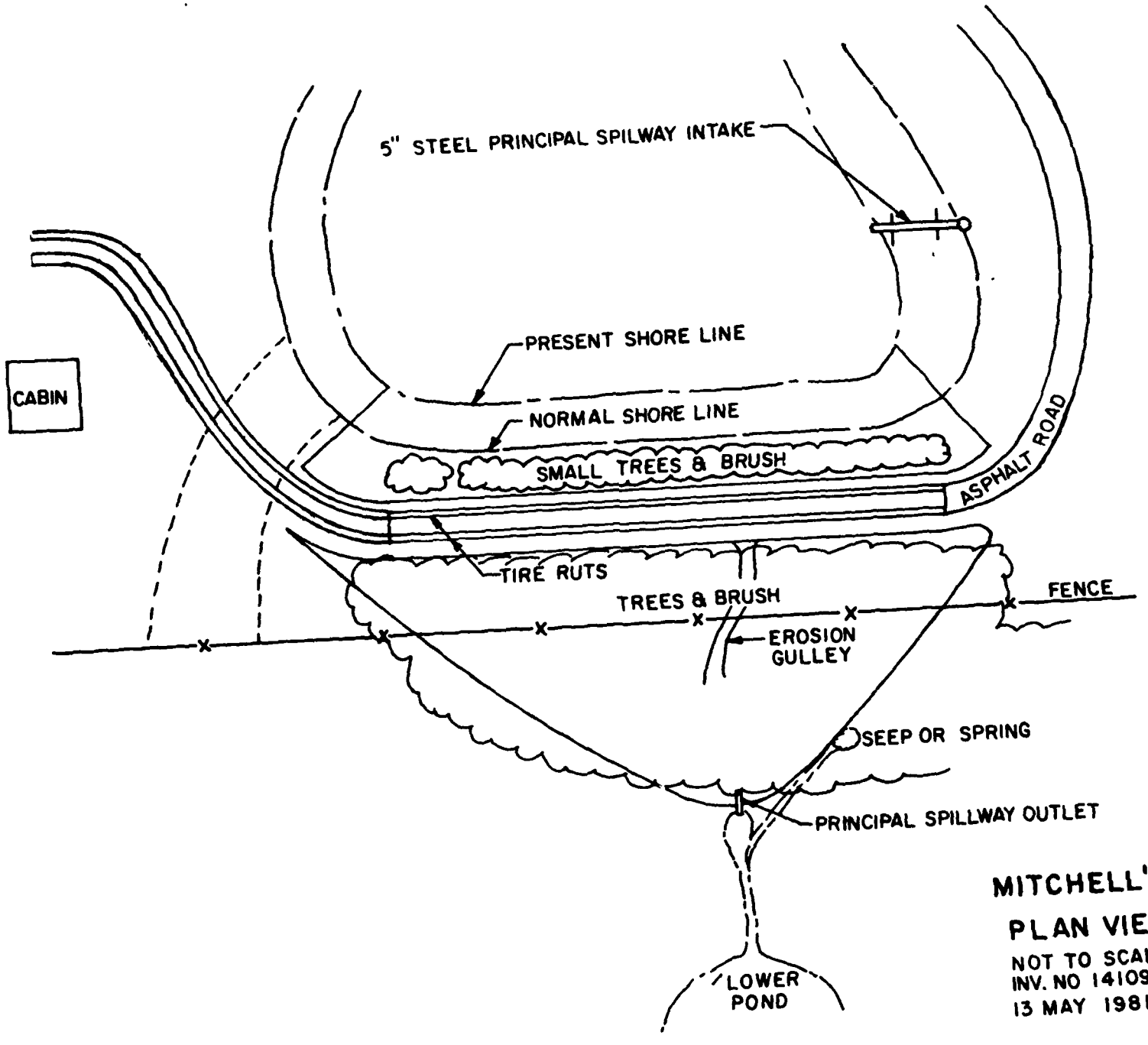
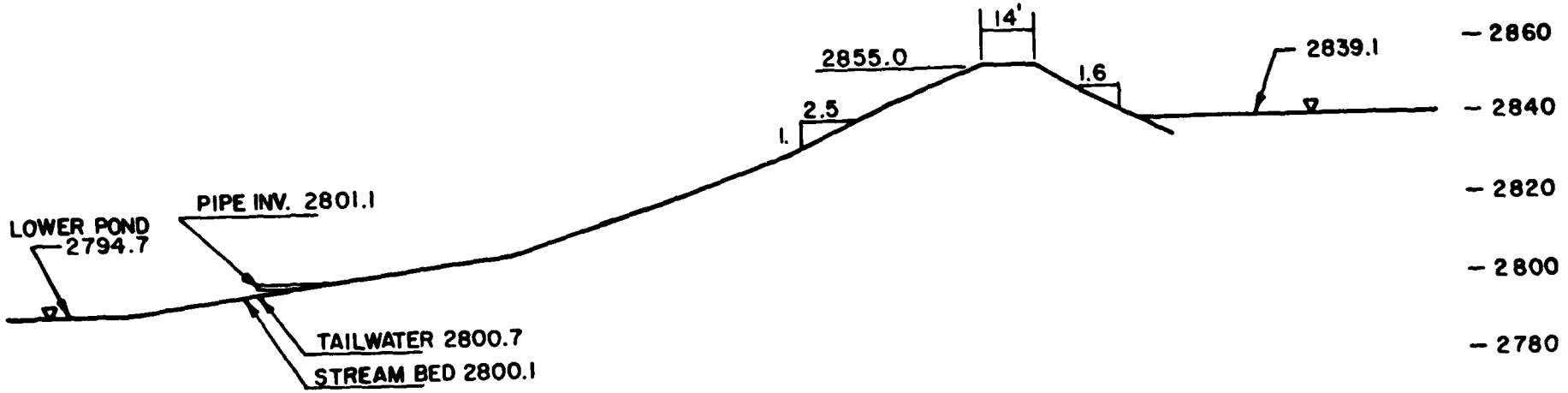
7000 FEET
1 KILOMETER
CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL



MITCHELL'S DAM

PLAN VIEW

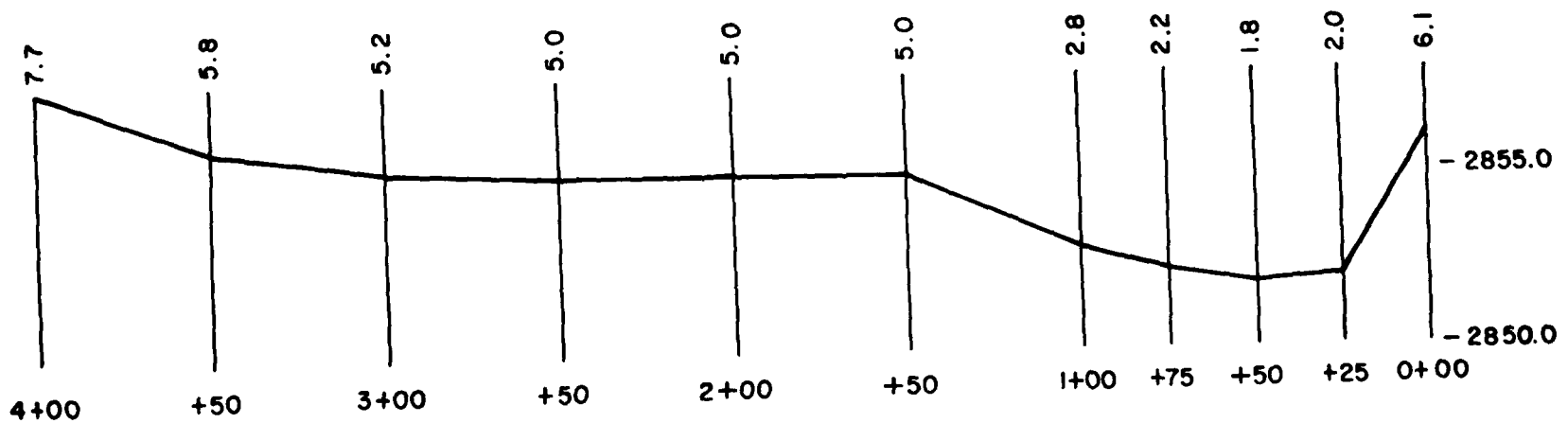
NOT TO SCALE
INV. NO 14109
13 MAY 1981



CROSS SECTION

STA. 2+50

SCALE: 1" = 40'



PROFILE

SCALE: VERT 1" = 5'-0"

HORZ. 1" = 5'-0"

MITCHELLS DAM

INV NO. 14109

13 MAY 1981

APPENDIX II

PHOTOGRAPHS

PHOTO #1 CREST OF DAM

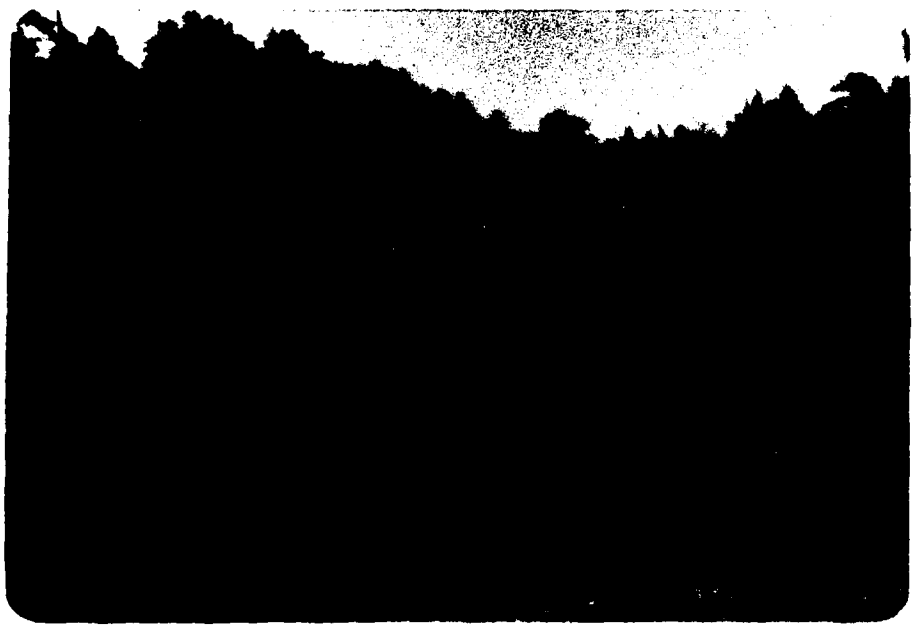


PHOTO #2 UPSTREAM FACE OF DAM

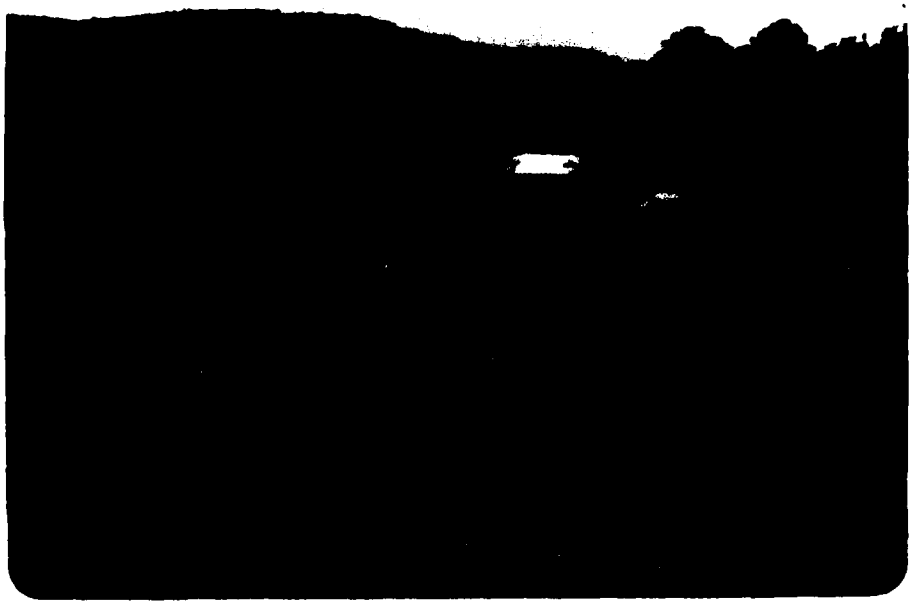


PHOTO #3 DOWNSTREAM FACE OF DAM

PHOTO #4 CREST & EMERGENCY SPILLWAY

PHOTO #5 PRINCIPAL SPILLWAY
INTAKE STRUCTURE
(5-INCH STEEL PIPE)

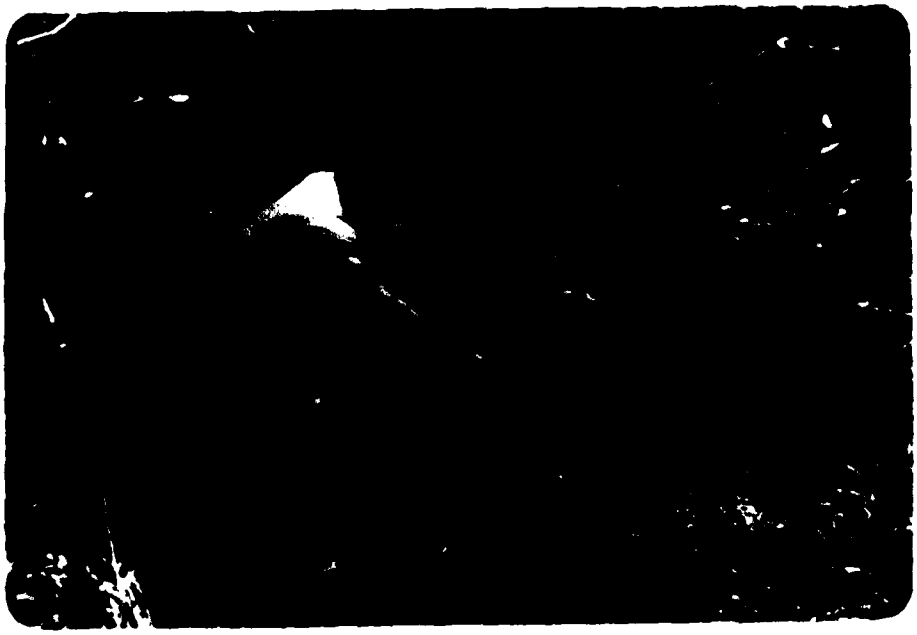


PHOTO #6 PRINCIPAL SPILLWAY/OUTLET

PHOTO #7 CAPTURED FLOW FROM SEEP/SPRING AT TOE OF DAM & LEFT ABUTMENT

PHOTO #8 SMALL DAM & POOL BELOW MITCHELL'S DAM WHICH SERVES AS PLUNGE POOL (THIS DAM IS PARTIALLY BREACHED)

APPENDIX III

FIELD OBSERVATIONS

Check List
Visual Inspection
Phase I

Name Dam: Mitchell County: Patrick State: Virginia Coordinates: Lat 3643.2
Long 8020.2

Date of Inspection: 13 May 1981 Weather: Fair Warm Temperature: 70 - 75°F

Pool Elevation at Time of Inspection: Tailwater at Time of Inspection:

Inspection Personnel:

M. Byrne, Corps of Engineers
B. Taran, Corps of Engineers
L. Jones, Corps of Engineers
J. Robinson, Corps of Engineers
D. Bushman, State Water Control Board
L. Musselwhite, State Water Control Board
Mr. S. H. Mitchell Owner

Byrne & Robinson, Recorders

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
FOUNDATION	The foundation appears. stable with no noticeable defects.	None.
ANY NOTICEABLE SEEPAGE	A spring, with an approximate flow of 5 GPM, is noted in the vicinity of the interface of the downstream embankment toe and left abutment. A swampy area exist at the toe of the dam in the vicinity of the spillway pipe outlet.	The seeps should be monitored for increase in size and/or turbidity. If the above conditions develop, qualified a Geotechnical Engineer should be contacted to evaluate the situation.
DRAINS	No evidence of internal drains were observed during the inspection.	None.
MATERIALS	Surface soils on the embankment consist of red highly micaceous low plastic silts (ML) with some very fine sand. (SM) Surface soils in the area consist of a mixture of very fine sands and clayey slits (MW) The ground surface of the embankment and abutments is generally moist.	The moist condition of the ground surface can be attributed to recent rainfall
VEGETATION	The upstream embankment face is covered with weeds small trees and thorny vines down to the normal pool elevation. The embankment is void of vegetation below this point. The crest of the dam which serves as a dirt road is covered with weeds and grass. The downstream slope is completely overgrown with vegetative cover consisting of large trees (1 to 1.5 ft. in diameter) and heavy undergrowth.	The trees shrubs and saplings should be cut off at ground level. Remove not structure of all trees greater than 3" in diameter and back fill with compacted earth and seed.

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	There are no signs of surface cracks on the embankment.	None.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	No unusual movement or cracking, is noted at or beyond the embankment toe.	None.
SLOUGHING OR EROSION OF EMBNKMENT AND ABUTMENT SLOPES	There are areas of minor sloughing at pool-embankment interface and minor erosion along the upstream embankment slope. The downstream slope has signs of past erosion in the form of gullies winding down the embankment. The gullies appear stable with a protective covering of decayed leaves and vegetation.	None.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	The vertical and horizontal alignment of the dam appear good.	None.
RIPRAP FAILURES	There is no riprap protection on the dam.	NONE

PRINCIPAL SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
CONTROL SECTIONS	The principal spillway, located in the left side of the reservoir, is a rusted steel pipe approximately 5-inches in diameter sloping into the reservoir. The pipe intake is covered with a wire trash protection device. The reservoir was about 8 feet lower than the intake, but water could be heard tickling into the pipe A valve stem running along the pipe is in poor condition and may be partially open or rusted through.	The owner may wish to prevent flows from passing through the dam by reparing the pipe or just by blocking off the discharge.
DISCHARGE CHANNEL	The outlet pipe discharges into a marshy area just above a small reservoir located downstream of Mitchell Dam.	None.
EMERGENCY GATE	A valve stem (heavily rusted) runs along the principal spillway pipe. It is assumed that the valve at the bottom of the reservoir is 5-inches.	None.

EMERGENCY SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
CONTROL SECTIONS	The control section is the low point across the crest of the dam at the right abutment. The open channel spillway is traversed by an access dirt road. Standing water and little vegetation appear on the spillway.	NONE
APPROACH CHANNEL	The approach channel is mild sloped with average vegetation.	None.
DISCHARGE CHANNEL	The discharge channel is well vegetated and heavily wooded in the lower reaches.	Some trees should be cut down to remove obstructions in the discharge channel.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATION
MONUMENTATION/SURVEYS	There are no known monuments in the immediate area.	None.
OBSERVATION WELLS	There are no observation wells.	None.
WEIRS	There are no weirs.	None.
PIEZOMETERS	There are no piezometers.	None.
STAFFGAGES	There are no staffgages.	A staffgage should be installed in the reservoir to extend above the crest of the dam.

RESERVOIR

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	The area around the reservoir is primarily grazing land for area farmers. The slopes are mostly mild with some steep areas. The reservoir slopes are steep.	None.
SEDIMENTATION	The inspection team was unable to evaluate sedimentation in the reservoir.	None.

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	A small dam with a reservoir is immediately below Mitchell Dam. Its emergency spillway has partially eroded. The area below the small dam is heavily wooded. Some debries is evident below the small dam.	None
SLOPES	The surrounding slopes are moderate to steep with heavy vegetation.	None.
APPROXIMATE NO. OF HOMES AND POPULATION	There are two homes about 1.5 miles downstream of the dam. Due to the drop in elevation from the dam to the homes, a dam failure could produce property damage and possibly cause loss of lines in the home.	None.

APPENDIX IV

REFERENCES

REFERENCES

1. Recommended Guidelines for Safety Inspection of Dams, Office of the Chief of Engineers, Department of the Army, Washington, D. C.

2. HEC-1DB Flood Hydrograph Package, (Hydrologic Engineering Center, U. S. Army Corps of Engineers, September 1978.)

3. "Probable Maximum Precipitation Estimates, United States East of the 105th Meridian," Hydrometeorological Report No. 51, (U. S. Weather Bureau, June 1978).

4. "Rainfall Frequency Atlas of the Unites States", Technical Paper No. 40, (U.S. Weather Bureau, May 1961).

5. "Design of Small Dams", Technical Publication of United States Department of the Interior, Bureau of Reclamation, Second Edition, Revised Reprint, 1977.